

REMARKS

Claims 1-20 are pending in the present application. Claims 1-20 were rejected. Claim 1 has been amended. No new matter is added by the amendment.

Claim Rejections under 35 U.S.C. 102:

Claims 1, 3-7, 14, 17-18 and 20 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,338,363 to Kawata et al (hereinafter "Kawata"). In response, Applicant respectfully submits that the rejection of these claims under 35 U.S.C. 102(b) may not be maintained because each and every element set forth in claim 1 is not found in Kawata.

Claim 1 has been amended to recite a thin film deposition reactor comprising, *inter alia*, a diffusion plate mounted on a lower surface of the shower head plate, the diffusion plate having a plurality of spray holes which are in communication with the first connection line and face the upper surface of the wafer to spray the first reaction gas and/or inert gas onto the wafer, and a plurality of nozzles which are in communication with the second connection line and extend toward the inner side surface of the reactor block to spray the second reaction gas and/or inert gas toward edges of the wafer, whereby the first and second reaction gases and/or inert gases are independently applied on the wafer without mixing each other.

In claim 1, the first reaction gas and/or inert gas are applied to the wafer (W in Fig. 3 of the Application) through the first connection line (121) and the spray holes (131) communicating with the first connection line (121), and the second reaction gas and/or inert gas are applied to the wafer (W) through the second connection line (122) and the nozzles (133) communicating with the second connection line (122). Thus, the first and second reaction gases and/or inert gases are applied to the wafer (W) without mixing each other in a reactor block (110). On the contrary, the first and second reaction gases: SiH₄ and O₂, in Kawata, are met and mixed in a mixing chamber (17 in Fig. 10 of Kawata) after supplied from the reaction gas supply units (19a

and 19b). Thus, the mixed reaction gases are supplied to a semiconductor substrate (6) (See, col. 7, ll. 36-44 of Kawata). The first and second reaction gases, in Kawata, are not independently applied to the semiconductor substrate (6).

Further, the first inert gas passage (28) in Kawata is not the second connection line (122), as claimed in claim 1, because the first inert gas passage (28) does not supply the second reaction gas but the first inert gas (See, col. 9, ll. 54-57 of Kawata). Furthermore, one of the reaction gas supply units (19a or 19b) for supplying the first or second reaction gas does not communicate with a plurality of inert gas injection holes (25).

Thus, Kawata does not disclose or teach the element: a diffusion plate mounted on a lower surface of the shower head plate, the diffusion plate having a plurality of spray holes which are in communication with the first connection line and face the upper surface of the wafer to spray the first reaction gas and/or inert gas onto the wafer, and a plurality of nozzles which are in communication with the second connection line and extend toward the inner side surface of the reactor block to spray the second reaction gas and/or inert gas toward edges of the wafer, whereby the first and second reaction gases and/or inert gases are independently applied on the wafer without mixing each other, as claimed in claim 1.

Accordingly, Kawata does not anticipate or render obvious claim 1. Therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. 102(b).

Claims 3-7, 14, 17-18 and 20 depend from claim 1, thus include all the limitations of claim 1. It is thus believed that claims 3-7, 14, 17-18 and 20 are believed to be allowable for at least the reasons given for claim 1, which is believed to be allowable.

Claim Rejections under 35 U.S.C. 103:

Claims 2 and 19

Claims 2 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata in view of U.S. Patent No. 5, 439,524 to Cain et al (hereinafter "Cain").

As discussed with regard to the rejection of claim 1 under 35 U.S.C. 102, Kawata fails to teach or suggest the element: a diffusion plate mounted on a lower surface of the shower head plate, the diffusion plate having a plurality of spray holes which are in communication with the first connection line and face the upper surface of the wafer to spray the first reaction gas and/or inert gas onto the wafer, and a plurality of nozzles which are in communication with the second connection line and extend toward the inner side surface of the reactor block to spray the second reaction gas and/or inert gas toward edges of the wafer, whereby the first and second reaction gases and/or inert gases are independently applied on the wafer without mixing each other, as claimed in claim 1.

Cain discloses a plasma processing apparatus in which a fluid distribution head having a non-planar dispersion plate is provided. The fluid distribution head of Cain includes one fluid inlet pipe (44 in Fig. 2 of the Cain) and no nozzle. Thus, Cain does not cure the deficiency of Kawata.

Thus, the combination of Kawata and Cain does not render obvious claim 1. Claims 2 and 19 depend from claim 1, and claims 2 and 19 are believed to be allowable for at least the reasons given for claim 1.

Claims 8, 9 and 12

Claims 8, 9 and 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata in view of U.S. Patent No. 5,976,261 to Moleshi et al (hereinafter "Moleshi").

Moleshi discloses a programmable multi-zone showerhead for ultraclean controlled

injection of multiple process gases into a fabrication equipment process chamber. Moleshi does not suggest or teach that a diffusion plate having a plurality of nozzles extending toward the inner side surface of the reactor block to spray the second reaction gas and/or inert gas toward edges of the wafer. Thus, Moleshi does not cure the deficiency of Kawata.

Accordingly, the combination of Moleshi and Kawata does not render obvious claim 1. Claims 8, 9 and 12 depend from claim 1, and claims 8, 9 and 12 are believed to be allowable for at least the reasons given for claim 1.

Claims 10 and 15

Claims 10 and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Kawata in view of U.S. Patent No. 5,425,812 to Tsutahara et al (hereinafter "Tsutahara").

Tsutahara discloses a reaction chamber for a chemical vapor deposition apparatus for achieving an improved uniform film deposition of high accuracy. An inner room (63a in Fig. 13 of Tsutahara) includes a mixer (39 in Fig. 13) for mixing reaction gases. Thus, Tsutahara does not cure the deficiency of Kawata.

Accordingly, the combination of Kawata and Tsutahara does not render obvious claim 1. Claims 10 and 15 depend from claim 1, and claims 10 and 15 are believed to be allowable for at least the reasons given for claim 1.

Claim 11

Claim 11 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata and Tsutahara in view of Japanese Patent No. 09316644 to Arai et al (hereinafter "Arai").

Arai discloses a shower head nozzle of CVD device having a heat exchanging means and having a predetermined thickness to improve a film forming rate without deteriorating a film quality. However, Arai does not teach or suggest that first and second connection lines and a diffusion plate having a plurality of nozzles extending toward the inner side surface of the

reactor block to spray the second reaction gas and/or inert gas toward edges of the wafer. Thus, Arai does not cure the deficiency of Kawata and Tsutahara in individual or combination.

Accordingly, the combination of Kawata, Tsutahara and Arai does not render obvious claim 1. Claim 11 depends from claim 1, and is believed to be allowable at least the reasons given for claim 1.

Claim 13

Claim 13 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata in view of U.S. Patent No. 5,076,207 to Washitani et al (hereinafter "Washitani").

Washitani discloses an atmospheric CVD apparatus. Washitani does not suggest or teach first and second connection lines and a diffusion plate having a plurality of nozzles extending toward the inner side surface of the reactor block to spray the second reaction gas and/or inert gas toward edges of the wafer. Thus, Washitani does not cure the deficiency of the Kawata.

Accordingly the combination of Kawata and Washitani does not render obvious claim 1. Claim 13 depends from claim 1, and is believed to be allowable for at least the reasons given for claim 1.

Claim 16

Claim 16 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kawata in view of Arai.

As discussed above with regard to the rejection of claim 11, the combination of Kawata and Arai does not render obvious claim 1. Claim 16 depends from claim 1, and is believed to be allowable for at least the reasons given for claim 1.

Conclusion

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims, as amended herein, are now allowable to Applicant. Thus, reconsideration and allowance are respectfully requested.

The Examiner is invited to contact Applicant's attorneys at the below-listed phone number with any questions. If there are any charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicant's attorneys.

Respectfully submitted,

By:



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Date: April 21, 2003

VERSION WITH MARKINGS TO SHOW CHANGES MADE

CLAIM AMENDMENTS

Please amend claim 1, as shown in marked up form below:

1. (Twice Amended/Marked up) A thin film deposition reactor comprising:
 - a reactor block on which a wafer is placed;
 - a shower head plate for uniformly maintaining a predetermined pressure by covering the reactor block;
 - a wafer block installed in the reactor block, on which the wafer is to be seated;
 - an exhausting portion connected to the reactor block for exhausting a gas from the reactor block;
 - a first connection line in communication with the shower head plate, through which a first reaction gas and/or inert gas flow;
 - a second connection line in communication with the shower head plate, through which a second reaction gas and/or inert gas flow; and
 - a diffusion plate mounted on a lower surface of the shower head plate, the diffusion plate having a plurality of spray holes which are in communication with the first connection line and face the upper surface of the wafer to spray the first reaction gas and/or inert gas onto the wafer, and a plurality of nozzles which are in communication with the second connection line and extend toward the inner side surface of the reactor block to spray the second reaction gas and/or inert gas toward edges of the wafer, whereby the first and second reaction gases and/or inert gases are independently applied on the wafer without mixing each other.

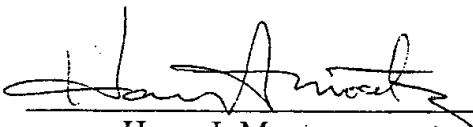
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Expires: August 15, 2003


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Director of Enrollment and Discipline

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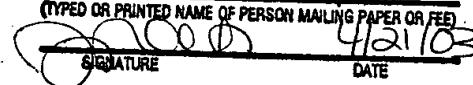
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